DOCUMENT RESUME

ED 122 496 EC 082 874

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TITLE Computerized Testing.
PUB DATE Apr 76
NOTE 22p.; Paper presented at the Annual International Convention, The Council for Exceptional Children (54th, Chicago, Illinois, April 4-9, 1976)

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage
DESCRIPTORS *Computer Assisted Instruction; *Criterion Referenced Tests; *General Education; Secondary Education; *Test Construction

ABSTRACT

Easy-Test has been developed to produce computer generated criterion referenced tests on any of 300 subject areas at the secondary level. The tests are drawn from over 14,000 items, can be used for diagnostic purposes, and have been shown to be both valid and reliable. Among limitations of the system are the inclusion of some items not taught in a particular school, and the random format of item presentation. (DB)

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COMPUTERIZED TESTING

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Presented

Council for Exceptional Children
Council for Educational Diagnostic Services
Chicago, Illinois

April 1976

EC092574

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INTRODUCTION

The purpose of diagnostic educational testing should be related to anwering questions like: (1) How can we optimize the potential of pupils? (2) How can we engender a level of mastery in the key areas of knowledge and skills that will enable all pupils to enter into and benefit from school? (3) How can we combine forces with the technology of cybernetics to make our instructional process more effecient? (4) How can we stem the waste of human potential and bring hope and motivation to pupils where frustration and despair now exist (Samuda, 1975)? In other words, testing should focus on assisting teachers to design better and more appropriate instructional strategies based upon individual needs, dignity, and rights.

Presently, millions of educational dollars are being spent collecting information regarding the success and/or failure of groups of pupils in such areas as reading comprehension, use of the English language, mathematical abilities, and writing skills. The information derived from such testing is not useful for answering the questions posed previously. In fact, the information is rarely of any practical use to the classroom teacher if for no other reason than the

results are generally not made available until many months after the tests were administered. Another more fundamental reason, however, is that such testing is norm-referenced and is given and used to differentiate or discriminate among pupils according to their degrees of acheivement. As Bloom (1968) noted, if we merely want to apply selective and sorting devices to exclude a proportion of the school population from programs (e.g., promotion to the fifth grade, second-year chemistry, or college), or simply to use testing as a sorting mechanism (e.g., A,B,C,D,F grades, or placement into programs for the mentally retarded), then the use of norm-referenced examinations serve ideally.

By comparison, criterion-referenced testing can help teachers determine whether or not a particular instructional program is suitable for a specific pupil or set of pupils. As Mehrens and Lehmann (1975) have written:

> "The recent support for criterion-referenced measurement seems to have originated in large part from the emphasis on behavioral objectives, the sequencing and individualization of instruction, the development of programmed materials, a learning theory that suggests that almost anybody can learn almost anything if given enough time, and a belief that norm referencing promotes unhealthy competition and is injurious to low-scoring students' self-concepts (1975,p.12)."

Conceptually then, this kind of testing procedure is designed to measure student achievement in comparison to the objectives of a curriculum (Brown,1976).

To the degree that diagnosticians are committed to discovering the potentialities of pupils,so that remedial instructional programs may be designed and implemented, and yet continue to rely on norm-referenced tests that differentiate and discriminate among pupils,there will be professional as well as ethical dissonance between what we say is right and what we actually do through testing. Perhaps this dissonance reflects the diagnosticians recognition that the public

continues to expect an educational accounting as to how pupils (combined) in one locality compare to other pupils at the state and national levels and is not concerned with the individual pupil — that is the responsibility of the parent. Whatever the reason(s), it is time that diagnosticians take a professional stand and focus exclusively on the pupil in need of educational assistance.

DEVELOPMENT

Because of the limitations of norm-referenced testing for helping pupils with special needs, a practical approach to criterion-referenced testing has been developed for use by secondary teachers to diagnose and monitor pupil needs and progress. To the degree that classroom teachers have valid and reliable criterion-referenced tests to help identify and assist pupils experiencing educational difficulty, the more time diagnosticians will have to concentrate on preventative methods with younger pupils. Called Easy-Test, this system generates test instruments covering a wide range of secondary content areas.

Easy-Test began with the collection of a large number of test items gathered from such sources as teacher tests and tests construction projects. Items which were content-specific, poorly worded, or poorly constructed were deleted. The remaining items were then assigned a permanent file number and entered into the computer bank. The items are then cross-referenced by subject matter. For example, an item dealing with the U.S. Constitution might be listed under U.S. History, Civics, and Problems of American Democracy. There are currently about 300 subject areas listed in the system and over 14,000 itmes. Both the number of subjects and items are increasing rapidly.

The computer was then, programmed to generate tests. Teachers simply request a test specifying the desired number of questions and the subject area to

be covered. If a math teacher wants a 100 item test covering Algebra 1, the request is coded and the computer will randomly select 100 items dealing with Algebra 1, and print them out in multiple choice, true-false, fill-in, and matching formats. To use the test, a teacher only has to duplicate the print-out and it is then ready for classroom use. Answers are printed to the right of the questions, but they do not appear on the student copy.

Assuming that remediation of learning problems at the secondary level cannot be divorced from subject content areas, most special instruction will be tied closely not only to helping the pupil achieve skills related to increasing abilities, but also to passing his/her courses. Motivation factors operate strongly in remediation programs at the secondary level and must be acknowledged by the diagnostician and the classroom teacher. Therefore, the more specific the test requested (e.g., Algebra 1, factoring), the more diagnostic the test becomes. As long as there are items in the computer bank dealing with the desired subject area, no matter how specific, the computer can produce a test on that subject.

Normally, a teacher will spend hours developing tests. Using Easy-test, a teacher can have a set of quizzes ready for classroom use with only a minute of work. The teacher can then monitor a students' progress, letting the student know where he stands and allowing the teacher to diagnose special needs and problems.

VALIDITY AND RELIABLILITY

Comparisons of objectives covered by tests generated from the system and objectives in district curricula have provided significant data about test content validity. Where tests contain a minimum of 50 items and where district objectives for a course are not less in number, correlations have ranged from .70 to 1.00.

Mean correlations of .76 have resulted in numerous pilot studies that have been conducted. Although not outstanding, these coefficients are encouraging. Investigations of reliability have been conducted using randomly parallel forms with the same pupil populations. Several random selections of items covering the same content were administered to the same pupils over a period of one week (e.g., three 50 item tests on Biology 11). Results indicate that where the tests contained a minimum of 50 items, pupil scores were relatively consistent, yielding correlation coefficients of at least .73 to a maximum of .86.

Recently school districts have indicated a strong interest in expanding the system from its original intent of summative evaluation format. Therefore, major topical areas such as Biology are being task analyzed into more specific units such as Anatomy, Ecology, and Genetics. Items in the bank will be cross-referenced to these units to permit generation of more specific tests for use throughout the year.

LIMITATIONS

There are a few limitations of which include:

1. There will be some items on each test generated referring to content not taught in a particular district. This should not exceed ten percent of the items. However, the tests do reflect what a large number of educators consider important in a topical area, and not just what an individual teacher may concentrate.
2. The purpose of this system is to provide data through which teachers can help improve their instruction and therefore help pupils to achieve their potentialities. It is not a teacher evaluation system. Poor scores on a test only indicates <u>where</u> a district needs improvement, not <u>why</u>. The "why" could include such factors as inadequate materials, low student ability, inadequate student prerequisite skills, poor

facilities, etc. Therefore, scores below the desired proficiency level should merely indicate areas of concern requiring special attention to determine the specific factors responsible for the scores.

3. This is not a complete testing system. It addresses only cognitive learning which can be evaluated by written test items. The system does not generate diagrams, nor does it produce items that require other than paper and pencil responses. Learning in the affective and psychomotor areas are not addressed at this time.
4. There is no discrimination between items on the basis of level of behavior or grade level. Knowledge, comprehension, application, analysis and synthesis items may or may not all be found on any one test, depending on which items are randomly selected. This kind of specificity is beyond the technical capacities of the testing system at this time as several times more items would be required in addition to time required to analyze and code items by level.
5. Item format is random. There is no way to request exclusively short answer or true-false questions. Any one test may include true-false, short answer, multiple choice, fill-in, and matching items.

If these limitations are considered in relation to existing secondary level testing practices, their significance is definitely moderated. The conscientious use of this system will provide for the first time a way of analyzing the results of many specific programs in relation to prespecified criterion levels and in relation to results of other similar instructional programs.

SUMMARY

The most recent definitive publication on computer-assisted test construction (Lippy, 1973) indicates that approximately 50 computer-assisted test preparation

activities are underway, only 5 of which are designed for public school use, and only eight of the total contain in excess of 5,000 items. Furthermore, nearly all of the computer banks were developed covering a single topical area. This statistic provides some perspective regarding the scope of the undertaking.

The Easy-Test system is not the ultimate and final answer to comprehensive testing. However, it seems at the very least a giant step in the right direction. On just the basis of time savings alone with respect to the efforts required of teachers in preparing examinations, the system is credible. Tests generated in one minute of computer time would otherwise require three to seven hours to prepare, even where teachers already have items available in some form for typing. Because all items are edited twice before being entered into the computer banks, item quality is consistently superior to teacher constructed instruments. Finally, because of its extremely simple conceptual design, the system can readily be understood by its users.

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Appendix A

Sample Test and Answer Key

COMPUTER-ASSISTED TESTING
IGNACIO
HJERMST 8
09/30/75

SCIENCE **********
FIRST AID **********

0001. WHITE CORPUSCLES PERFORM WHICH IMPORTANT FUNCTION.
A. MAINTAINING SHAPE OF BLOOD CELLS
B. CARRYING OXYGEN
C. CARRYING FOOD
D. DESTROYING BACTERIA

0002. MATCH THE FOLLOWING.

( )A.	A SUBSTANCE WHICH COUNTERACTS POISON	1. STRONG ACIDS OR ALKALIS
( )B.	A WOODY SHRUB OR TREE IN SWAMPY AREAS	2. FIRST DEGREE BURN
( )C.	BEST TYPE OF FIRST AID KIT	3. SECOND DEGREE BURN
( )D.	BURN IN WHICH ONLY THE SKIN IS REDDENED	4. ANTIDOTE
( )E.	THESE SHOULD NOT BE BROKEN OR PRICKED	5. THIRD DEGREE BURN
( )F.	A SUBSTANCE USED TO INDUCE VOMITING	6. POISON OAK
( )G.	BLISTERS DEVELOP WITH THIS TYPE OF BURN	7. POISON SUMAC
( )H.	POISONS WHICH SHOULD NOT BE VOMITTED	8. POISON IVY
		9. UNIT TYPE
		10. MASTERS TYPE
		11. BLISTERS
		12. SYRUP OF IPECAC

0003. MATCH THE FIRST AID PROCEDURE WITH THE ACCIDENT TYPE APPROPRIATE TO THE PROCEDURE.

( )A.	TO DILUTE AS FAST AS POSSIBLE AND THEN INDUCE VOMITING	1. SHOCK
( )B.	TO RELIEVE PAIN, PREVENT CONTAMINATION AND TREAT FOR SHOCK	2. POISONING BY MOUTH
( )C.	TO PREVENT OR REDUCE SHOCK BY KEEPING THE VICTIM LYING DOWN	3. BURNS
		4. HANGING

0004. MOST PERSONS LIVE ---- MINUTES AFTER BREATHING STOPS.
A. 2
B. 4
C. 6
D. 8
E. 10

0005. WHEN USING MOUTH TO MOUTH RESPIRATION, HOW MANY TIMES PER MINUTE SHOULD YOU BLOW INTO THE VICTIM'S MOUTH IF HE IS AN INFANT & IF HE IS AN ADULT.

0006. YOU SHOULD ---- THE ARM IF THERE IS A SEVERE CUT ON THE LOWER ARM.
A. ELEVATE
B. LOWER
C. AMPUTATE
D. RUB

0007. MATERIAL PLACED DIRECTLY OVER THE WOUND IS CALLED THE ----.

0008. WHAT LIQUID SOLUTION SHOULD BE USED TO RINSE THE AREA WHERE THE BONE PENETRATES THE SKIN IN A COMPOUND FRACTURE.
A. 1 TEASPOON SALT TO 1 PINT VINEGAR
B. 1 TEASPOON SODA TO 1 QUART WATER
C. 1 TEASPOON SALT TO 1 QUART WATER
D. 1 TEASPOON VINEGAR TO 1 PINT WATER

0009. T F
ALL BREAKS IN A BONE ARE FRACTURES.

0010. IF THE ENDS OF A BROKEN BONE DO NOT PENETRATE THE SKIN, THE BREAK IS CALLED A ---- FRACTURE

0011. T F
COLD SHOULD BE APPLIED IMMEDIATELY TO A SPRAIN.

0012. MATCH THE FOLLOWING.

( )A.	1ST DEGREE BURN	1. TISSUE DESTROYED
( )B.	2ND DEGREE BURN	2. SKIN BLISTERED
( )C.	3RD DEGREE BURN	3. SKIN REDDENED

COMPUTER-ASSISTED TESTING
IGNACIO
HJERMST 8
09/30/75

**CIENCE
**IRST AID
**
**0001.
**D.
**
**
**0002.
**A-4, B-7, C-9
**D-2, E-11,
**F-12, G-3, H-1
**
**
**
**0003.
**A-2, B-3, C-1
**
**
**
**
**0004.
**C.
**
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*0005.
*INFANT-20
*ADULT-12
*
*
*
*0006.
*A.
*
*
*0007.
*DRESSING
*
*
*0008.
*C.
*
*
*
*
*
*0009.
*T
*
*
*0010.
*SIMPLE
*
*
*
*0011.
*T
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*
*
*0012.
*A-3, B-2, C-1
*
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Appendix B

Computer Bank Content Areas

BANK CONTENT
02/16/76

C3 COLL SCIENCE

01	SCIENCE METHOD	14
02	HIST AND SYSTEMS	76
03	FIELDS OF PSYCHOLOGY	14
04	DEVELOPMENTAL	64
05	PHYSCOL	108
06	LEARNING	129
07	LEARNING THEORIES	13
08	TESTS & MEASUREMENT	54
09	STATISTICS	42
10	PERSONALITY	81
11	ABNORMAL BEHAVIOR	134
12	PSYCHO THERAPY	89
13	SOCIAL PSYCHOLOGY	202
14	SENSATION	94
15	PERCEPTION	89
16	MOTIVATION	98
17	EMOTION	80
18	THINKING	90
19	MINORITIES	20
20	SEXUAL BEHAVIOR	16
21	SLEEP	14
22	DRUGS	13
23	ATTITUDES	13
24	DEFENSE MECHANISMS	30
25	FEAR/ANXIETY	10
26	CREATIVITY	9
27	PROBLEM SOLVING	13
28	PSYCHOLINGUISTICS	18
29	CONCEPTS/IMAGERY	17
30	ICHTHYOLOGY	4
31	ENTOMOLOGY	5
	DISCIPLINE TOTAL	1653

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01 LANGUAGE ARTS

A1	UPTON SINCLAIR	1
A2	EMILY DICKENSON	3
A3	FINLEY PETER DUNNE	2
A4	HAMLIN GARLAND	2
A5	HENRY JAMES	1
A6	OLE ROLVAAG	1
A7	WM.D.HOWELS	2
A8	WALT WHITMAN	1
A9	THEODORE DREISER	1
B1	LEW WALLACE	1
B2	AMBROSE BIERCE	1
B3	JACK LONDON	1

B4	RALPH W. EMERSON	1
B5	ODYSSEY	27
B6	OEDIPUS	10
B7	RIP VAN WINKLE	5
B8	A CHRISTMAS CAROL	3
B9	MAN WITHOUT A COUNTRY	4
C1	LEGEND OF SLEPPY HOLLOW	4
C2	JOHN G. WHITTIER	1
C3	CHARGE OF LIGHT BRIGADE	2
C4	VOCABULARY	17
C5	PARADISE LOST	1
C6	NATURALISM	3
XX	TEMPORARY	451
15	SECONDARY ENGLISH	102
16	CONTRACTIONS-POSSESSIVES	13
17	GRAMMAR & USAGE	308
19	JOURNALISM	3
20	WORLD LITERATURE	130
21	MEDIEVAL LITERATURE	8
22	ELIZABETHAN LITERATURE	69
23	17TH CENTURY LITERATURE	2
24	18TH CENTURY LITERATURE	4
25	ROMANTIC LITERATURE	12
28	MODERN AMERICAN LIT.	40
29	AMERICAN LITERATURE	247
30	AMERICAN LIT.--REALISM	43
31	CIVIL WAR LITERATURE	50
32	MARK TWAIN	62
33	LIBRARY SCIENCE	111
34	SHAKESPEARE	55
35	SHORT STORY	2
36	THOREAU	12
37	VERBS	52
38	TOM SAWYER	42
39	REFERENCES	96
40	POETRY	62
41	SPEECH	48
42	MYTHOLOGY	24
43	CLASSICAL LIT	63
44	DRAMA	55
46	COMPOSITION	37
47	SYLLABICATION	1
48	PARTICIPLES	7
49	NOUNS	8
50	PHRASES	27
51	LIT. TECH. & DEVICES	78
52	CAINE MUTINY	1
53	PREFIXES	31
54	PRONOUNS	27
55	ADVERBS	9
56	CAPITALIZATION	7
57	PARTS OF SPEECH	15
58	SENTENCES	55
59	PLURALS	13
60	ADJECTIVES	6
61	VERBALS	3
62	SUFFIXES	35

63	ACTIVE-PASSIVE VOICE	3
64	PREPOSITIONS	3
65	PUNCTUATION	1
67	ROOTS	27
68	FABLES	3
70	HAMLET	21
71	WRITING	5
72	CANTERBURY TALES	3
73	JULIUS CAESAR	6
74	ROMEO & JULIET	11
75	WASHINGTON IRVING	6
76	JAMES F. COOPER	8
77	WILLIAM C. BRYANT	7
78	JOHN G. WHITTIER	5
79	EDGAR A. POE	11
80	NATHANIEL HAWTHORNE	4
81	HERMAN MELVILLE	3
82	HARRIET B. STOWE	2
83	JOHN STEINBECK	1
84	CARL SANDBURG	1
85	WM. FAULKNER	1
86	ALPHABETIZING	4
87	SYNONYMS	1
88	LAT. AM. STUDIES-SPANISH	21
89	SPANISH-GRAM. & CONV.	46
90	DISCUSSIONS	17
91	FACT & OPINION	3
92	ADVERTISING	1
93	ANTONYMS	2
94	CHURCHILL	2
95	LONGFELLOW	1
96	O'HENRY	4
97	ROBT. FROST	2
98	HEMINGWAY	1
99	STEPHEN CRANE	4
	DISCIPLINE TOTAL	2862

02 MATH

XX	TEMPORARY	139
01	OPERATIONS W/REAL NOS.	89
02	PROPERTIES	6
03	SOLUTIONS FOR LINEAR EQ.	70
04	SOL. QUAD. & HIGHER DEG.	13
05	SIMULTANEOUS EQUATIONS	15
06	EXPONENTS	24
07	COMBINING POLYNOMIALS	28
08	PROD. & QUOT. OF POLYNOM	56
10	WRITING ALGEBRAID EXPRES	19
11	WORD PROBLEMS	29
12	VOCABULARY (ALGEBRA)	17
13	ABSOLUTE VALUE	2
14	LOG/EXPONENTIAL FCT. (EQ)	13
15	GRAPHING LINEAR EQUATION	9

16	GRAPHING QUADRATIC & HIG	2
18	ALGEBRAIC FRACTIONS	9
19	FUNCTIONS	1
20	ALGEBRA I	335
21	ALGEBRA II	14
30	TRIGONOMETRY	44
35	RATIO & PROPORTION	28
36	BASES-OTHER THAN 10	3
40	GEOMETRY	163
41	GEOMETRIC SOLIDS	11
42	PLANES & PLANE FIGURES	112
43	TRIANGLES	53
44	ANALYTIC GEOMETRY	34
45	CALCULUS	16
49	CONSUMER MATH	7
50	BUSINESS MATH	22
51	LOGIC	12
52	PROBABILITY-STATISTICS	36
53	ARITHMETIC-BASIC MATH	157
54	NUMBER SYSTEM	36
55	RECIPROCALS & PERCENT	15
56	MEASURES & MEASUREMENTS	2
57	FACTORING POLYNOMIALS	84
58	FRACTIONS & DECIMALS	112
59	SQ. & CUBE ROOTS	3
60	MATRICES & DETERMINATES	1
61	INEQUALITIES	2
62	EVALUATING EXPRESSIONS	13
63	COMPLEX NUMBERS	1
64	ANGLE MEASURE	11
65	SIN	10
66	COS	7
67	TAN	4
68	PERIODIC FUNCTIONS	2
69	LAWS OF TRIG FUNCTIONS	1
71	DOUBLE ANGLE FORMULAS	1
72	1/2 ANGLE FORMULAS	1
73	GRAPHING TRIG FUNCTIONS	4
74	COFUNCTIONS	1
75	TYPES OF ANGLES	23
76	VOCABULARY (GEOMETRY)	125
77	CONSTRUCTION	2
78	CONGRUENCE	11
79	HISTORY	3
80	PARALLEL LINES	6
81	PERPENDICULAR LINES	6
82	QUADRILATERALS	26
84	CIRCLES	26
85	POLYGONS	17
86	ARCS	8
87	CHORDS, SECANTS, TANGENT	7
89	LOCI	9
90	AREAS, SURFACE AREAS	15
91	VOLUMES	4
92	LINES (SEGMENTS)	12
93	COORDINATES	5

94	SOL.. OF RT. TRIANGLES	1
95	CONIC SECTIONS	5
	DISCIPLINE TOTAL	2210

03	SCIENCE	
A1	ARTHROPODS	3
XX	TEMPORARY	668
01	METABOLISM	21
02	CLASSIFICATION	3
03	THALLOPHYTA	1
04	SEX EDUCATION	2
05	ALCOHOL	21
06	INTEGUMENTARY SYSTEM	6
07	CIRCULATORY SYSTEM	11
08	RESPIRATORY SYSTEM	5
09	ANGIOSPERMS	19
10	EARTHQUAKES	55
11	GLACIATION	6
12	MINING	2
13	WEATHERING	3
14	EROSION	12
15	HISTORICAL GEOLOGY	21
16	PHYSICAL GEOLOGY	128
17	PETROLOGY	31
18	VOLCANISM	30
19	TIDES	9
20	GENERAL SCIENCE	228
21	ELEMENTARY SCIENCE	33
22	DESEASES	32
23	CELLS	3
24	ALGAE	1
25	SUN	3
26	VIRUSSES	1
30	BIOLOGY	449
31	ANATOMY	164
32	ECOLOGY	90
33	GENETICS	57
34	BOTANY	128
35	ZOOLOGY	104
36	FUNGI	21
37	EVOLUTION	26
38	HORMONES	37
39	CARDIOLOGY	15
40	DIGESTION	42
41	REPRODUCTION	55
42	BACTERIA	17
43	MUSCLES	13
44	SKELETAL SYSTEM	12
45	BRAIN AND NERVOUS SYSTEM	35
50	EARTH SCIENCE	432

51	OCEANOGRAPHY	83
52	METEOROLOGY	49
53	ASTRONOMY/SPACE SCIENCE	181
54	GEOLOGY	202
55	MINEROLOGY	32
56	FOSSILS	21
57	MOON	42
59	ELEMENTARY HEALTH	12
60	HEALTH	472
62	FIRST AID	154
63	PSYCHOLOGY	84
64	DRUGS	138
65	VENEREAL DISEASE	6
66	SUICIDES	3
67	PRE-NURSING	348
68	SAFETY	62
70	PHYSICS	198
71	LIGHT/OPTICS	39
72	MECHANICS/ENERGY	66
73	ELECTRICITY/MAGNETISM	98
74	SOUND	19
75	MEASUREMENT	23
76	CHEMISTRY	190
77	PERIODIC TABLE	34
78	SMOKING & TOBACCO	35
79	ATOMIC STRUCTURE	15
80	ENDOCRINE SYSTEM	5
81	ELEMENTS	5
82	FOOD & NUTRITION	6
83	SCIENCE HISTORY	17
84	ARCHEOLOGY	1
85	DIGESTIVE SYSTEM	25
86	INVERTEBRATES	8
87	ECHINODERMS	3
88	COELENTERATES	3
89	ANNELIDS	3
90	SPONGES	1
91	AMPHIBIANS	3
92	JAWLESS FISHES	2
93	BIRDS	2
94	MAMMALS	6
95	BONY FISHES	1
96	MICROSCOPY	2
97	REPTILES	3
98	MOSSES	9
	DISCIPLINE TOTAL	5816

04	SOCIAL STUDIES	
AI	CARTOGRAPHY	2
XX	TEMPORARY	189

21	WESTWARD EXPANSION	13
22	IMMIGRATION TO AMER.	4
23	INDUSTRIAL REV.	10
25	MESOPOTAMIA	3
27	NEOLITHIC PERIOD	1
28	AGE OF NAT. BLDG.	1
29	CLASSIC AGE	1
30	WORLD HISTORY	256
31	AMERICAN HISTORY	414
32	GEOGRAPHY	183
33	AMERICAN CONSTITUTION	87
34	AMERICAN GOVERNMENT	128
35	ECONOMICS	132
36	AMERICAN PROBLEMS	55
37	SOUTHEAST ASIA GEOGRAPHY	29
38	COLORADO HISTORY	17
39	UNITED STATES GEOGRAPHY	75
40	UNITED STATES LIFE	57
41	ENGLISH HISTORY	65
42	CIVIL WAR	45
43	WORLD WAR II	20
44	GREECE	27
45	ROME	19
46	EGYPT	7
47	AGE OF EXPLORATION	47
48	LATIN AMER. HIST.	22
49	NATIVE AMER. HIST.	12
50	HIST. OF FAR EAST	19
51	MIDDLE AGES	5
52	FEUDAL AGE	2
55	BYZANTINE EMPIRE	4
56	AMER. REVOLUTION	22
57	SPREAD OF ISLAM	3
58	INTERNATIONAL TRADE	14
59	FOREIGN POLICY	20
60	EXECUTIVE BRANCH	19
61	LEGISLATIVE BRANCH	28
62	JUDICIAL BRANCH	18
63	SEPARATION OF POWERS	18
64	BUREAUCRATIC BRANCH	7
65	LABOR RELATIONS	14
66	POLITICAL PARTIES	1
80	ECONOMIC GEOGRAPHY	66
81	COMPARATIVE ECO. SYSTEM	1
83	TRANSPORTATION SYSTEM	11
85	INTERNATIONAL DEVE.	7
87	LABOR	6
91	COLONIAL PERIOD	36
92	RECONSTRUCTION	3
93	COLO. GEOGRAPHY	4
94	FEDERALIST PERIOD	11
95	ARTICLES OF CONF.	3
96	JEFFERSONIAN PERIOD	12
97	JACKSONIAN PERIOD	9
98	GILDED AGE	2
99	PRE CIVIL WAR	5
	DISCIPLINE TOTAL	2291

05	THE ARTS	
01	PERCEPTION	10
02	COMPOSITION	10
03	INSTRUMENTS	17
04	STAFF & CLEF	3
05	SCALES & KEY SIGNATURES	1
06	TIME VALUE	14
07	COMPOSERS	4
08	SINGING	15
09	DRAWING	7
10	PRINCIPALS OF DESIGN	1
11	SCULPTURE	1
12	PHOTOGRAPHY	69
13	COLOR	18
14	CERAMICS	20
15	MUSIC THEORY	5
16	MECH. OF MUSIC	16
17	MUSIC HISTORY	10
18	JAZZ	4
19	LEATHERWORK	1
	DISCIPLINE TOTAL	226

06	VOCATIONAL ED	
XX	TEMPORARY	208
32	ELECTRONICS	122
35	DRIVER'S ED (COLORADO)	167
36	FOODS	168
38	GAME MANAGEMENT	11
39	OCCUPATIONAL AWARENESS	13
40	TYPING (BEGINNING)	57
42	AUTOMECHANICS	386
43	BOOKKEEPING	168
44	OUTDOOR EDUCATION	166
45	AGRICULTURE	3
46	BUSINESS	170
47	HOME ECONOMICS	94
48	BUILDING TRADES	26
49	WOODS & WOODWORKING	29
50	TOOLS FOR WOODWORK	42
51	MECH. DRAWING	45
52	METALS & METALWORKING	57
53	MINING	5
54	BANKING	46
55	INSURANCE	21
56	SECRETARIAL	17
57	VACATIONS	3
58	PLASTICS	2
59	JEWELRY"	2
60	PRINTING	4
61	TELEVISION	3
	DISCIPLINE TOTAL	2035

08 PHYSICAL EDUCATION	
XX TEMPORARY	372
01 BADMINTON	21
03 ICE HOCKEY	28
04 SOCCER	13
06 TRAMPOLINE	8
07 VOLLEYBALL	41
08 WEIGHT TRAINING	20
09 WRESTLING	2
10 FOLK & SQUARE DANCING	16
11 SOFTBALL	27
12 SWIMMING/DIVING	3[illegible]
20 KNOWLEDGE BOWL	648
DISCIPLINE TOTAL	1226

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